(Lecture 07) T-bill ladder

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1 Chasing yield: first steps

The average yield of a savings account in the United States is 0.41%, as of February 18, 2025, according to the FDIC.[1] For checking accounts, this is even less, at 0.07%. These are effectively nil and even negative when accounting for inflation. This contrasts with *high yield savings accounts* (HYSA), which currently offers between 4.35% and 4.75%, depending on the account according to Investopedia. [2] The difference between low- and high-yielding accounts is not magic. Rather, it depends on what the account provider does with your deposits once the funds are in the provider's possession. We will defer a discussion about how banks work for another lecture. For now, in brief, banks invest peoples' deposits in assets that they believe will be higher yielding than the return they offer depositors. If a bank invests in a U.S. Treasury yielding 3%, and only gives you 0.41% for holding your deposits with them, they get to keep the 2.59% spread as profit. The key is that regular people have the ability to invest their savings in U.S. treasuries directly, bypassing the banks entirely. This lecture will introduce one way of doing this.

2 Bills, Bonds, and Battlestar Galactica

Let's consider the 6-month T-bill. This contract consists of (1) a principle amount, (2) an annualized yield r, and (3) a maturity date of 6 months out. It is offered by the U.S. Treasury, meaning that there is almost zero likelihood of default. Put together, if you invest \$1,200 in a 6-month T-bill, you'll receive $1200\left(1+\frac{r}{2}\right)$ in 6 months – e.g., at 4% this is \$1224. [3]

One way of investing is to continually roll over the investment whenever it expires every 6 months. This means that the principle will grow as $(1200, 1224, 1248, 1273, 1299, \ldots)$ every 6 months. This is perfectly reasonable if the market yield on the treasuries remains the same. However, this fails to hold up in practice. Figure 1 demonstrates the yield on 6-month T-bills from January, 2020 to January, 2025. We can see that yields were almost zero for the first two years, rose in 2022, remained flat about 5.5% through 2024, and have recently come down. This follows very close to the federal funds window, the overnight rates controlled by the Federal Reserve, but not exactly.

Following the regular roll over strategy, you could have invested your entire portfolio 6-month T-bill in January, 2022, as soon as rates began to rise. In this case, you would have needed to wait 6 months before getting exposure to the higher yield of almost 2% the following July. Meanwhile, the price of your bonds would have been underwater, exposing your portfolio to greater risk. If you were forced to sell your bonds prior to maturity, you would have needed to take a loss. [4]

3 Chutes and ladders with T-bills

The *T-bill ladder strategy* instead suggests that you change up your investment from \$1,200 in T-bills every 6 months to 200 in T-bills every month (compounding applied). This means that, though 2022,

[1] https://www.fdic.gov/national-rates-and-rate-caps

[2] https://www.investopedia.com/best-high-yield-savings-accounts-4770633

[3] Of course, U.S. Treasuries are taxed as ordinary income at the federal level, so your net yield will be less. See https://www.investopedia.com/ask/answers/013015/how-are-treasury-bills-taxed.asp.

[4] Bond prices are inversely correlated to yield. If you initially pay \$100 for a bond yielding 4%, that bond will pay out \$104 (assuming no default). The second-hand exchange price of the bond may fluctuate, so if the price falls to \$95, the market yield would be near 9.5%. Notably, *Silicon Valley Bank* failed in March, 2023 because it had to liquidate bonds designated as "hold to maturity." These bonds were priced significantly lower than what SVB bought them for, due to higher interest rates.

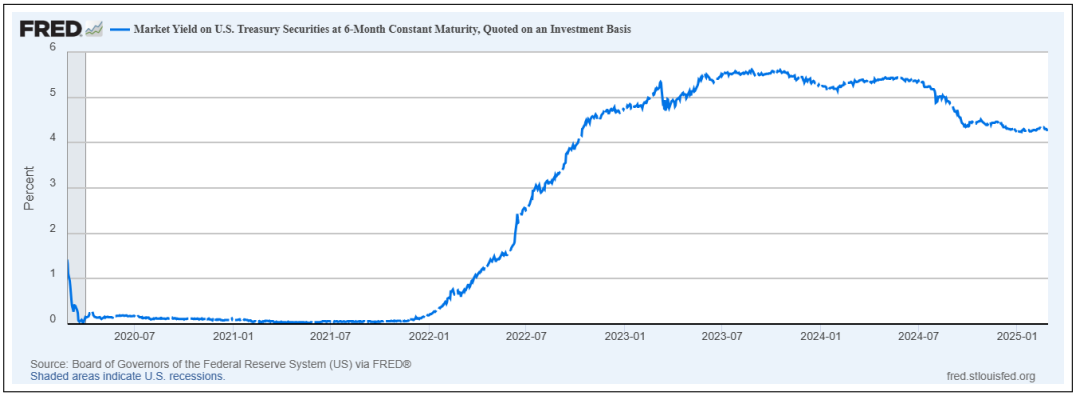


Fig. 1. Market yield on U.S. Treasury Securities at 6-month Constant Maturity. *Source: FRED.*

you would have invested $200 for 6-month T-bills at the rates: (0.19, 0.48, 0.60, 1.09, 1.49, 1.64) and rolled each of them over 6 months later at the rates (2.52, 2.96, 3.34, 3.97, 4.58, 4.65), respectively.

This strategy provides two main advantages over the regular roll over strategy. First, we can clearly see that this captures the rise in rates over time. Second, it provides significant liquidity every month. If you need cash for an unexpected payment, for example, you don't have to sell bonds to cover the expense at an inopportune time. The flip-side disadvantage of this strategy is that, if rates fall, as happened through 2024, then you catch those changes in rates too.

4 Revisiting high-yield savings accounts

Given our understanding of how U.S. Treasuries can be bought sporadically over time, how is it that HYSA can offer higher yields? Taking a look at Fidelity's *Money Market* fund can provide us some insight. [5] Fidelity's SPAXX fund currently offers 4.03% (with a 0.42% expense ratio in fees) and has consistently tracked about 0.25% below the federal funds rate, over at least the last 5 years. In Figure 2, we see that this fund consists of 36.43% repurchase agreements, 34.10% T-bills, 22.67% in agency floating-rate securities, and the remaining percentage in other assets. [6] As long as the composition of this fund is earning a yield higher than 4.03%, SPAXX can offer its depositors this yield. [7]

It stands to reason that high-yield savings accounts may be funds holding high-yielding treasuries, among other assets. [8] The recent high-water mark for 10-year U.S. Treasury yields was 4.98% in October, 2023, greater than the 4.75% offered by the highest-yielding HYSA today. [9] When you deposit your funds into a HYSA, it seems that you are allocated dividends from that investment pool, minus fees captured by the account provider.

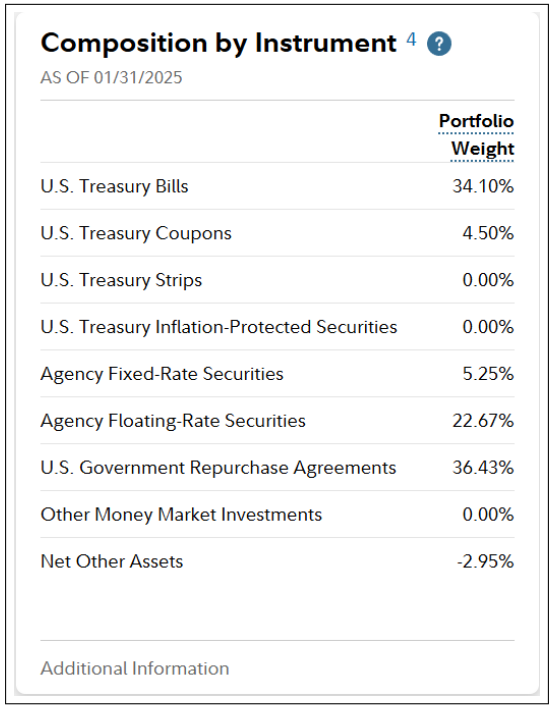
[5] https://fundresearch.fidelity.com/mutual-funds/composition/31617H102

[6] The Overnight Reverse Repurchase Agreements Award Rate is currently 4.25%, the same as lower-bound of the federal funds window rate. See https://fred.stlouisfed.org/series/RRPONTSYAWARD. "Agency floating-rate securities" describes debt offered by government-sponsored enterprises or federal departments other than the U.S. Treasury. See https://www.investopedia.com/terms/a/agencysecurities.asp.

[7] To my understanding, this fund itself is not insured by the FDIC. This is for informational purposes only. Talk to a financial advisor for investing advise.

[8] This paragraph is speculative per my current understanding about how the financial system works.

[9] https://fred.stlouisfed.org/series/DGS10



Composition by Instrument [4]

AS OF 01/31/2025

	Portfolio Weight
U.S. Treasury Bills	34.10%
U.S. Treasury Coupons	4.50%
U.S. Treasury Strips	0.00%
U.S. Treasury Inflation-Protected Securities	0.00%
Agency Fixed-Rate Securities	5.25%
Agency Floating-Rate Securities	22.67%
U.S. Government Repurchase Agreements	36.43%
Other Money Market Investments	0.00%
Net Other Assets	-2.95%

Additional Information

Fig. 2. Composition by Instrument of SPAXX Money Market fund. *Source: Fidelity.*